

G. Rudorf and R. J. Meyer respectively, after which comes, if we may so express it, another *pièce de résistance* in the shape of a splendid article on tin from the pen of Ernst Cohen. In this is to be found a very scholarly and learned essay on the early history of this metal, and an exhaustive and beautifully illustrated account of that romantic and fascinating subject, the allotropic forms of metallic tin. As is well known, the chemistry of tin owes much to the researches of Cohen, and we are not disappointed in expecting to find his treatment of the subject exceptionally full and interesting.

Tin is followed by a long monograph on lead, by Ahrens and Pick. Here again the reviewer feels it his pleasant duty to bestow unstinted praise. The article opens with a very full account of the metallurgy of lead. The fundamental researches of Schenck and Rassbach on the heterogeneous equilibria between PbS , $PbSO_4$, PbO , and SO_2 , are dealt with, however, under PbS . The electrochemical relations between lead and its ions are clearly and fully explained, including the work of Cumming on the oxidation-potentials of PbO_2 . The chemistry of lead and its compounds offers many interesting points, all of which afford the author good opportunities for demonstrating the power and scope of physico-chemical methods of attack. Amongst these may be mentioned the work of Pleissner and Auerbach on the basic sulphates and carbonates of lead, the work of Pleissner and Auerbach and of Dolezalek on the solubility of $PbSO_4$ in water and sulphuric acid solutions, the work of Lewis on the solubility of $Pb(NO_3)_2$ in solutions of KNO_3 and $NaNO_3$, the stabilities and mutual relations of the oxides of lead, &c. In connection with the latter subject, the author has, however, missed the work of Brislee on Pb_2O .

In dealing with the demonstration by Allmand and Denham of the existence of monovalent lead ions, the author suggests by way of criticism that the experiments alluded to could be explained in another way, i.e. by the assumption of the existence of complex kations of the formula Pb_2^+ . These might still be monovalent ions, and the assumption by Allmand and Denham of the simpler formula Pb^+ remains the best explanation until the existence of such complex kations is experimentally demonstrated.

After lead comes an article on the lead accumulator, by Mugdan. Needless to say, the article is chiefly concerned with the thermodynamic theory as worked out so beautifully by Dolezalek, although due mention is made of the early work of Faure, Planté, Gladstone and Tribe, and Streintz. This excellent article may be earnestly commended to the attention of electrical engineers. The usual English treatises on the lead accumulator consist of constructive details plus a little perfectly useless juggling with chemical symbols.

Thorium, the last member of the series, is dealt with by R. J. Meyer. Here is to be found an excellent account of the manufacture and optical (selective radiation) theory of the incandescent gas mantle.

Throughout the book colloidal states of matter are treated by Lottermoser. Of especial interest are the articles dealing with those classical examples, silicic and stannic acids.

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Atomic weights are dealt with by Brauner in masterly fashion.

On laying down this wonderful volume, one cannot help feeling, as in the case of its predecessors, that Abegg's great undertaking marks the beginning of an era, the era of scientific inorganic chemistry. One realises with a spirit of rejoicing that inorganic chemistry has become a rational science of which every chemist may justly feel proud. The day of the why and the wherefore has dawned. One may beg leave to reason in inorganic chemistry as in other exact sciences. What middle-aged chemist of the present day can forget the inorganic chemistry of his youth, with its alchemistic recipes, its dry lists of formulæ, and its grim determination to explain actions by means of symbols invented to describe the static facts of composition? It was in truth little more than a sort of glorified black magic. Even at the present day there are not wanting signs that this sort of thing is not entirely dead. How many of our young graduates could read and thoroughly understand the pages of Abegg's "Handbuch"? One would not like to hazard an answer to that question, and yet on that answer depends very largely the hope of future progress. The methods of physical chemistry have converted the empiricism of the older inorganic chemistry into the rational science of to-day. The same tremendous transformation is fast approaching in the sphere of organic chemistry. Other things being equal, the victory lies with those who can best command the keen-edged weapons of physics and mathematics.

F. G. D.

TWO MAMMAL BOOKS.

- (1) *The Grizzly Bear: the Narrative of a Hunter Naturalist, Historical, Scientific, and Adventurous.* By W. H. Wright. Pp. x+274; illustrated. (London: T. W. Laurie, 1909.) Price 7s. 6d. net.
 (2) *The Animals and their Story.* By W. P. Westell. Pp. 322; illustrated. (London: R. Culley, n.d.) Price 5s. net.

(1) A VERY cordial welcome should be extended to Mr. Wright's intensely interesting volume, which has an exceptional value as embodying the experiences and opinions of a man who has hunted the great bear of the Rocky Mountains at a time when it was more numerous than is at present the case. The author tells us that he was born in New Hampshire in 1856, and that some time after 1883 he commenced bear-hunting during such intervals as could be spared from his business. Later on, in 1889, hunting became his profession, and he was seldom long away from the woods, his trips being sometimes made alone, but more frequently with companions who desired to be initiated into the mysteries of bear-stalking, and were able and willing to pay for the privilege.

"In the beginning," he writes, "I studied the grizzly in order to hunt him. I marked his haunts and his habits, I took notice of his likes and dislikes. . . . And then at last my interest in my opponent grew to overshadow my interest in the game. . . . I came to hunt him in order to study him. I laid aside my rifle. It is twelve years since I have killed a grizzly. Yet in all those years there is not

one but what I have spent some months in his company. And then (alas! that it had not been sooner) I undertook to photograph him."

The book commences with an account of the early history of the species, as given by Lewis and Clark and subsequent writers; and the author discusses whether the animal ought to be called the grisly (meaning fierce) or grizzly (grey) bear. He decides in favour of the latter, although admitting that Lewis and Clark used grisly (perhaps in the sense of grey), and that Ord gave the name *horribilis* as the Latin equivalent of grisly in its proper sense. In our own opinion this usage ought to be followed.

To follow the author through his bear-hunting and "bear-snapping" experiences is, in our limited space, impossible, and we must be content in directing attention to the beauty and interest of his photographs of grizzlies in their native wilds. Very interesting, too, are his pictures of the slots of the grizzly and the black bear, showing how widely they differ from one another. The front claws of a grizzly are generally described as being whitish and nearly straight; but the author shows that the latter definition is incorrect, and that they are better described as narrower and less sharply curved than those of other bears.

The book is teeming with interest, and may be cordially recommended to naturalists and sportsmen as a trustworthy account of a disappearing species.

(2) Commendation of a like nature can, we regret to say, scarcely be accorded to the second of the two works forming the subject of this notice. Mr. Percival Westell is a voluminous writer on the fauna of Britain and various groups of invertebrates, but has hitherto, we believe, not tried his hand on mammals as a whole. In the present volume he has attempted to give an account of a selection of the more interesting types of the class, especially those represented in the London Zoological Gardens, arranged according to the nature of their environment, and illustrated with a number of photographs and coloured plates. The photographs are for the most part worthy of all praise, while the execution of the coloured plates is also good, although it is a pity that in some instances—notably the one of the wapiti—the artist was furnished with such poor models.

The volume is confessedly a compilation, largely made up of extracts from the writings of Mr. Seious and two well-known works on natural history—one, by the way, somewhat out of date. When he confines himself to direct extracts from these Mr. Westell does not wander far from the right path, but when he draws material from his own mind the result is disastrous. We are calmly told, for instance, on p. 245, that, in consequence of the domestication of the species, there are probably no wild yak in Tibet; while from the text and figure on pp. 245 and 246 the author would appear to be labouring under the impression that the cows are hornless. On p. 139 we are informed that it is the brindled, instead of the white-tailed, gnu that is verging on extinction; while from the statement on p. 314 it would appear that the author is quite unaware of the existence of the white rhinoceros in Lado and the Bahr-el-Ghazal, where it is not

in the least danger of extermination. Striped elands (p. 174) are said to occur in northern Africa, where there are no elands at all; Grévy's zebra (p. 114) is stated to have been discovered by Grant and Speke; and the roebuck is affirmed to be a near ally of the muntjac (p. 113). As instances of carelessness we may mention (p. 267) *Kabern* for *Kaberu*, and (p. 220) *arin* for *arui*. To quote Mr. Ingersoll (p. 242) as the authority for the absence of deer from Ethiopian Africa is about equivalent to referring to Sir Robert Ball as sponsor for the rising of the sun to-morrow morning; while the statement on p. 304 with regard to the distinctness or identity of the European and American beavers is absurd.

Many other blunders and instances of carelessness might be quoted, but the foregoing are sufficient to indicate the untrustworthy nature of Mr. Westell's book.

R. L.

RELIGIO PHYSICI.

Man and the Universe: a Study of the Influence of the Advance in Scientific Knowledge upon our Understanding of Christianity. By Sir Oliver Lodge, F.R.S. Pp. viii+356. (London: Methuen and Co., n.d.) Price 7s. 6d. net.

In this vigorous and attractive work Sir Oliver Lodge has gathered into a more or less systematic whole his well-known views upon the relation between science and religion. The result is a "Religio Physici" which recalls its famous prototype as much by contrast as by similarity. Sir Oliver Lodge, like Sir Thomas Browne, is at once a man of science and a sincere and candid friend to religion, but his apology for this position is far from a mere demonstration that a whimsical temperament can (by a *credo quia impossibile est*) hold incompatibles in conjunction. Nor does he follow the dangerous precedents of later apologists, who have strained analogies to prove that science and orthodox Christianity, so far from being at loggerheads, are really in perfectly amicable agreement. There is, admits Sir Oliver, "an outstanding controversy" between orthodox men of science and orthodox theologians, "although active fighting has been suspended." The reason for this controversy is "that the attitudes of mind appropriate to these two classes" are "at present fundamentally diverse." Such being the case, the only hope of reconciliation lies in the admission on the part both of man of science and of theologian that neither is in occupation of the sole point of view from which truth is visible. In particular, the man of science must learn "that it is a sign of unbalanced judgment to conclude, on the strength of a few momentous discoveries, that the whole structure of religious belief, built up through the ages by the developing human race from fundamental emotions and instincts and experiences, is unsubstantial and insecure."

In place of such partisan exclusiveness we must cultivate the conviction that science and religion both contain systems of truth which must ultimately prove to be congruent: "the region of true religion and the region of completer science are one."

In pursuance of this plan of reconciliation, Sir